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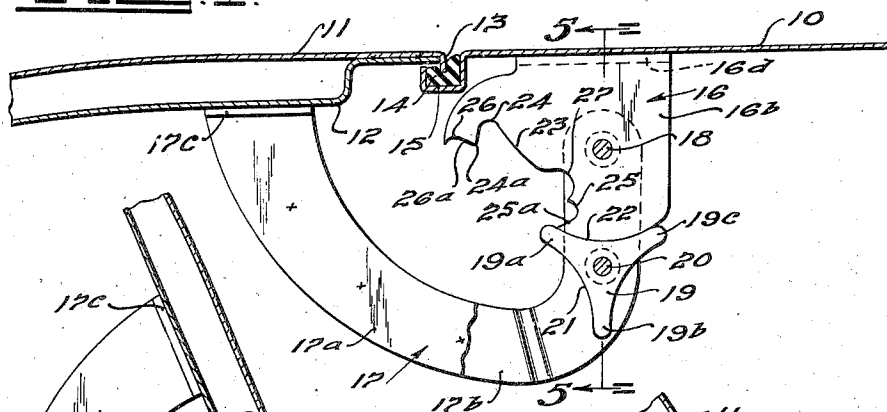
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2,126,579

HINGE CONSTRUCTION

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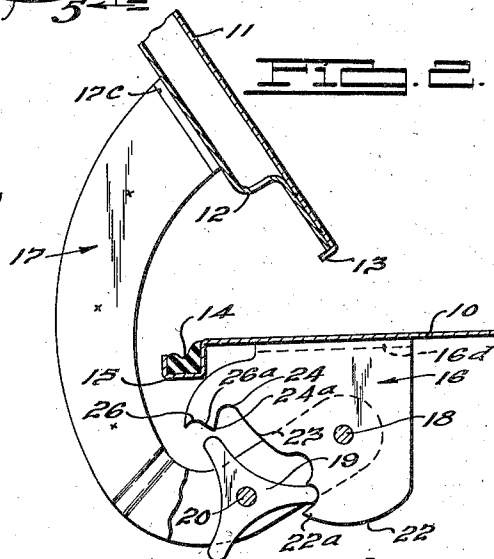
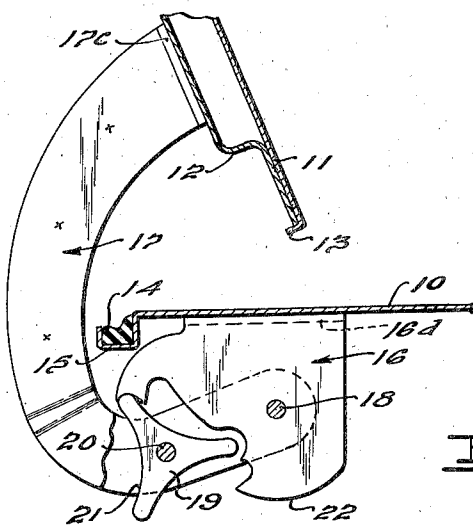
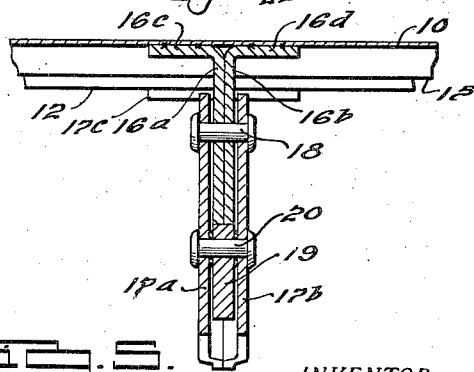


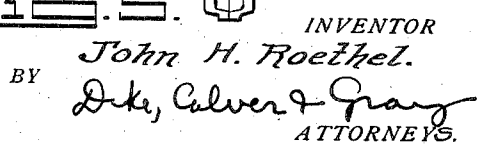
Fig. 3.



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1. 5.



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UNITED STATES PATENT OFFICE

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HINGE CONSTRUCTION

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17 Claims. (Cl. 16—138)

This invention relates to hinges particularly adapted for pivotally connecting together a swinging closure and a fixed body or support, the hinge of the present invention being especially useful in connection with swinging doors or lids of vehicle bodies, such as trunk, hood or deck lids of motor vehicles.

An object of the invention is to provide a hinge for an upwardly swinging closure or lid which is provided with improved, relatively simple and efficient means for automatically locking the lid in a raised position, the locking means being operated simply by manipulating the lid in raising and lowering the same.

A further object is to provide a hinge comprising a fixed or stationary hinge member and a movable hinge member pivoted together, the members being provided with cooperating locking and unlocking means including a rotatable device, such as a wheel with equally spaced teeth or projections, effective in cooperation to rotate the wheel step by step into successive positions, either for locking or unlocking the parts, when the lid is raised to a given position, then lowered to locked position and thereafter raised and lowered toward closed position.

Other objects of this invention will appear in the following description and appended claims, reference being had to the accompanying drawing forming a part of this specification wherein like reference characters designate corresponding parts in the several views.

Fig. 1 is a fragmentary longitudinal section of a portion of an automobile body illustrating a lid or closure hinged to the body by means of a hinge device constructed in accordance with the present invention.

Fig. 2 is a view somewhat similar to Fig. 1 but illustrating the lid in raised locked position.

Fig. 3 is a somewhat similar view illustrating the lid in an elevated position preparatory to lowering the same into locked position.

Fig. 4 is a similar view illustrating the lid raised from its locked position preparatory to lowering the same into the position illustrated in Fig. 1.

Fig. 5 is a vertical sectional view taken along the line 5—5 of Fig. 1.

Before explaining in detail the present invention it is to be understood that the invention is not limited in its application to the details of construction and arrangement of parts illustrated in the accompanying drawing, since the invention is capable of other embodiments and of being practiced or carried out in various ways.

Also it is to be understood that the phraseology or terminology employed herein is for the purpose of description and not of limitation, and it is not intended to limit the invention claimed herein beyond the requirements of the prior art.

In the drawing there is illustrated, by way of example, a hinge embodying the present invention as applied to a swinging closure, such as the deck lid or trunk lid of an automobile body, the hinge comprising two hinge members pivoted together one thereof secured to a permanent or fixed part of the body and the other secured to the swinging lid or closure. It will be understood that the hinge may be utilized in connection with other closures such, for example, as the swinging hood lid of a vehicle body.

In the illustrated example the rear metal panel 10 of the body forming a deck, trunk or other compartment thereof is provided with an opening which is adapted to be closed by means of a swinging lid 11. This lid may comprise a stamped metal outer panel and an inner reinforcing panel 12 secured thereto by spot welding. The upper edge of the outer panel 11 terminates in the present instance in a transverse marginal flange or lip 13 cooperable, when the lid is closed, with a sealing strip 14 of rubber or other suitable material retained within a channel 15 formed along the adjacent edge of the permanent body panel 10. The hinge in the present instance comprises a fixed hinge member 16 secured to the body panel 10 and a swinging hinge member 17 fixed, for example, to the side edge of the lid 11 adjacent the top thereof. The fixed hinge member 16 comprises a pair of plates 16a and 16b spot welded or otherwise secured together face to face, as illustrated in Fig. 5, these plates having oppositely turned flanges 16c and 16d which are spot welded to the underface of the panel 10. The movable hinge member 17 also comprises a pair of metal plates which are spot welded together face to face and formed with oppositely turned flanges 17c which are spot welded to the upper edge of the inner panel 12 of the lid. The plates forming the hinge member 17 are offset adjacent their forward ends to provide spaced extensions 17a and 17b straddling the hinge member 16 as illustrated in Fig. 5. The extensions 17a and 17b of the hinge member 17 are pivoted to the fixed hinge member 16 through the medium of a pivot pin 18 in the form of a rivet extending through the parts and headed over at opposite ends.

Also housed between the bifurcated ends 17a and 17b of the hinge member 17 and arranged

below the hinge member 16 is a locking device 19 which in the present instance is in the form of a freely rotatable toothed member or star-shaped wheel. The toothed member 19 is pivoted to the spaced sides 17a and 17b by means of a rivet pin 20. This device is substantially star-shaped to provide three equally spaced teeth or projections 19a, 19b and 19c which are joined by inwardly curved arcuate edge portions 21 shaped to correspond to the curvature of the lower curved edge 22 of the hinge member 16.

Thus, when the lid 11 is fully closed, as illustrated in Fig. 1, one of the concave edge portions 21 will fit smoothly against the lower edge 22 of the hinge member 16 thereby positioning the wheel 19 so that when the lid is raised the wheel 19 and one of its teeth will travel into the proper position with relation to the cooperating locking portions of the hinge member 16.

The hinge member 16 is provided with a locking and unlocking portion cooperating with the teeth or projections 19a, 19b and 19c and adapted to control the position of the wheel 19 so that the hinge members may be automatically locked together and also unlocked by simply manipulating the lid 11. In the present instance the hinge member 16 is provided with an inclined cam forming edge 23 terminating at the top thereof in a recess or notch 24. The hinge member 16 is also provided with a locking recess or notch 25 adjacent the base 22 of the hinge member. Rearwardly of the recess 24 the hinge member 16 is formed with an overhanging portion provided with a cam-like recess or notch 26 and intermediate the cam portion 23 and the recess 25 there is provided a recess or notch 27.

It will be seen that when the lid 11 is raised from the closed position shown in Fig. 1 to the position shown in Fig. 3 the wheel 19 will be carried rearwardly with the hinge member 17, and the tooth 19a, as illustrated in dotted lines in Fig. 3, will engage and travel over the cam edge 23 until it is seated in the recess or notch 24, this position of the wheel 19 being illustrated in full lines in Fig. 3. At this point the lid will have been raised to its fullest extent and upward movement thereof will be limited by the abutment of the tooth 19a against the base of the recess 24. During this step in the operation it will be seen that the wheel 19 will have been partially rotated in a counter-clockwise direction from the dotted line position of Fig. 3 to the full line position thereof, thereby causing the tooth 19c to clear and pass around the corner 22a so as to position it opposite the locking recess 25. Hence, when the lid is lowered from the position of Fig. 3 to the position of Fig. 2 the tooth 19c will move into the recess 25 and will be anchored against the base thereof, thereby locking the hinge members 16 and 17 together and maintaining the lid in raised position as illustrated. As the wheel moves downward from the position of Fig. 3 to the position of Fig. 2 the nose of the projection 19c rides over the cam edge 23a into the recess 25 which effects a partial counter-clockwise rotation of the wheel causing the end of the projection 19a to pass the corner 24a and face the recess 26.

When it is desired to unlock the lid and lower it to its closed position it is merely necessary to raise the lid again from the position of Fig. 2 to the position of Fig. 4. In this operation the hinge member 17 is elevated somewhat thereby carrying the wheel 19 upwards. Since in the locked position of the parts the tooth 19a has been rotated to a position facing the cam-like

recess 26 it will, therefore, be seen that by raising the lid from the position of Fig. 2 to the position of Fig. 4 the nose of the tooth 19a will move into the recess 26 and due to the inclined cam edge 23a thereof engaging the tooth 19a the wheel 19 will again be slightly rotated in a counter-clockwise direction. Hence, in this step of the operation the tooth 19c will be rotated upwardly away from the locking recess 25, ample clearance therefor being provided by the recess 27. With the parts in the position of Fig. 4 the hinge members will be unlocked and the lid may then be lowered to its closed position since the wheel 19 will be carried downwardly free of locking engagement with the locking recess 25, the projection or tooth 19c riding over the jutting portion 22a which effects a further counter-clockwise rotation of the wheel so that when the lid is closed the parts will again assume a position as illustrated in Fig. 1.

I claim:

1. A hinge for a swinging closure carried by a body, comprising a fixed or stationary hinge member on the body and a movable hinge member on the closure pivoted to said fixed member to turn about a fixed axis, a rotatable locking device carried by one member, and means on the other member cooperable with said device to partially rotate said device successively into a series of positions when the closure is raised to a maximum position, then lowered to its locked position and thereafter raised and lowered, said means including a portion co-acting with the device to maintain the hinge members in fixed relative positions when the closure is in said locked position.

2. A hinge for a swinging closure carried by a body, comprising a fixed or stationary hinge member on the body and a movable hinge member on the closure pivoted to said fixed member, a rotatable locking device pivoted to one member at one side of the pivot of the hinge members, and means on the other member cooperable with said device to partially rotate said device step by step in a single direction into successive positions when the closure is raised to a maximum position, then lowered to its locked position and thereafter raised and lowered, said means including a portion co-acting with the device to maintain the hinge members in fixed relative positions when the closure is in said locked position.

3. A hinge for a swinging closure carried by a body, comprising a fixed hinge member on the body and a movable hinge member on the closure pivoted to said fixed member, a rotatable locking device carried by one member in spaced relation to the pivot of said members, and means on the other member cooperable with said device to partially rotate said device into three successive positions when the closure is raised to a maximum position, then lowered to its locked position and thereafter raised, the first and second named rotative steps of the device being effective to position the device in locking engagement with said means and the third rotative step being effective to position the device out of locking engagement.

4. A hinge for a swinging closure carried by a body, comprising a fixed hinge member on the body and a movable hinge member on the closure pivoted to said fixed member, a locking device mounted on one member to turn about an axis spaced from the pivot of said members, and means on the other member cooperable with said device to partially rotate said device step by step in a single direction into three successive posi-

tions when the closure is raised to a maximum position, then lowered to its locked position and thereafter raised, the first and second named rotative steps of the device being effective to position the device in locking engagement with said means and the third rotative step being effective to position the device out of locking engagement.

5. A hinge for a swinging lid or closure carried by a body, such as a vehicle body, comprising a fixed hinge member on the body and a movable hinge member on the closure pivoted to said fixed member, a rotatable locking device pivoted to the movable hinge member in spaced relation to the pivot of said members and bodily movable therewith when the lid is raised and lowered, and means on the fixed hinge member cooperable with said device to partially rotate said device into three successive positions when the closure is raised to a maximum position, then lowered to its locked position and thereafter raised, said means including a portion co-acting with the device to maintain the hinge members in fixed relative positions when the closure is in said locked position.

6. A hinge for a swinging lid or closure carried by a body, such as a vehicle body, comprising a fixed hinge member on the body and a movable hinge member on the closure pivoted to said fixed member, a locking device mounted on the movable hinge member to turn about an axis spaced from the pivot of said members and bodily movable therewith when the lid is raised and lowered, and means on the fixed hinge member cooperable with said device to partially rotate said device in a single direction into three successive positions when the closure is raised to a maximum position, then lowered to its locked position and thereafter raised, the first and second rotative steps of the device being effective to position the device in locking engagement with said means and the third rotative step being effective to position the device out of locking engagement.

7. A hinge for a swinging lid or closure carried by a body, such as a vehicle body, comprising a fixed hinge member on the body and a movable hinge member on the closure pivoted to said fixed member, a rotatable locking device mounted on the movable hinge member in spaced relation to the pivot of said members and bodily movable therewith when the lid is raised and lowered, and means on the fixed hinge member cooperable with said device to partially rotate said device in one direction step by step into a series of positions when the closure is raised to a predetermined elevated position, then lowered to a locked elevated position and then raised preparatory to lowering toward a closed position, one rotative step being effective to position the device for movement into locking engagement with said means and a succeeding rotative step being effective to position the device for movement out of locking engagement with said means.

8. A hinge for a swinging lid or closure carried by a body, such as a vehicle body, comprising a fixed hinge member on the body and a movable hinge member on the closure pivoted to said fixed member, a rotatable locking device including a star wheel carried by the movable hinge member and bodily movable therewith when the lid is raised and lowered, and cam means on the fixed hinge member cooperable with said device to partially rotate said device into three successive positions when the closure is raised to a maxi-

mum position, then lowered to its locked position and thereafter raised, said means including a portion co-acting with the device to maintain the hinge members in fixed relative positions when the closure is in said locked position.

9. A hinge for a swinging closure carried by a body, comprising a fixed or stationary hinge member on the body and a movable hinge member on the closure pivoted to said fixed member, a rotatable locking device carried by one member, and means on the other member cooperable with said device to partially rotate said device successively into a series of positions when the closure is raised to a maximum position, then lowered to its locked position and thereafter raised and lowered to fully closed position, said means including a recessed portion co-acting with the device to maintain the hinge members in fixed relative positions when the closure is in said locked position and said means operating to impart an angular movement of 120° to said device during said movement of the closure.

10. A hinge for a swinging closure carried by a body, comprising a fixed or stationary hinge member on the body and a movable hinge member on the closure pivoted to said fixed member, a rotatable locking device including a wheel having three radial projections carried by one member, and cam means on the other member cooperable with said device to partially rotate said device step by step in a single direction into successive positions when the closure is raised to a maximum position, then lowered to its locked position and thereafter raised and lowered to fully closed position, said means including a recessed portion co-acting with a projection on the device to maintain the hinge members in fixed relative positions when the closure is in said locked position and said means operating to impart an angular movement of 120° to said device during said movement of the closure.

11. A hinge for a swinging lid or closure carried by a body, such as a vehicle body, comprising a fixed hinge member on the body and a movable hinge member on the closure pivoted to said fixed member, a rotatable locking device including a wheel having equally spaced radial projections carried by the movable hinge member and bodily movable therewith when the lid is raised and lowered, and means including cam means on the fixed hinge member cooperable with said device to partially rotate said device in one direction step by step into a series of positions when the closure is raised to a predetermined elevated position, then lowered to a locked elevated position and then raised and then lowered toward a closed position, one rotative step being effective to position the device for movement into locking engagement with said means, a succeeding rotative step being effective to position the device for movement out of locking engagement with said means, and a further rotative step being effective to position said device with relation to said cam means in the closed position of the closure preparatory to a succeeding operation.

12. A hinge for a swinging lid or closure carried by a body, such as a vehicle body, comprising a fixed hinge member on the body and a movable hinge member on the closure pivoted to said fixed member, a rotatable locking device mounted on the movable hinge member in spaced relation to the pivot of said members and bodily movable therewith when the lid is raised and lowered, means on the fixed hinge member co-oper-

able with said device to partially rotate said device in one direction step by step into a series of positions when the closure is raised to a predetermined elevated position, then lowered to a locked elevated position and then raised and then lowered toward a closed position, one rotative step being effective to position the device for movement into locking engagement with said means and a succeeding rotative step being effective to position the device for movement out of locking engagement with said means, and means on said fixed hinge member cooperable with said locking device to fix the relative positions thereof in the lowered position of the closure.

13. A hinge for a swinging closure carried by a body, comprising a fixed hinge member on the body and a movable hinge member on the closure pivoted to said fixed member, a rotatable locking device mounted on one of said hinge members in spaced relation to the pivot of said members, and means on the other hinge member cooperable with said device to partially rotate said device step by step into a plurality of positions when the closure is swung in one direction to a predetermined open position, then in a reverse direction to a locked position and then in said first named direction again, one rotative step being effective to position the device for movement into locking engagement with said means and a succeeding rotative step being effective to position the device for movement out of said locking engagement.

14. A hinge for a swinging closure carried by a body, comprising a fixed hinge member on the body and a movable hinge member on the closure pivoted to said fixed member, a rotatable locking device mounted on one of said hinge members in spaced relation to the pivot of said members, and means on the other hinge member cooperable with said device to partially rotate said device step by step into a plurality of positions when the closure is swung in one direction to a predetermined open position, then in a reverse

direction to a locked position and then in said first named direction again, two rotative steps in the same direction being effective to position the device in fixed locking engagement with said means and a third rotative step being effective to move the device out of locking engagement to permit swinging of the closure toward closed position.

15. A hinge for a swinging closure carried by a body, comprising a fixed or stationary hinge member on the body and a movable hinge member on the closure pivoted to said fixed member, a rotatable locking device pivoted to one member at one side of the pivot of the hinge members, and means on the other member cooperable with said device to partially rotate said device step by step in a single direction into a series of positions when the closure is swung in one direction to a maximum open position, then in a reverse direction to a locked position and thereafter in said first named direction preparatory to swinging the closure toward its closed position, said means including a portion coacting with the device to maintain the hinge members in fixed relative positions when the closure is in said locked position.

16. A hinge according to claim 13 in which said means comprises cam means cooperable with projecting means on said device.

17. A hinge for a swinging closure carried by a body, comprising a fixed hinge member on the body and a movable hinge member on the closure pivoted to said fixed member, a rotatable locking device mounted on one of said hinge members in spaced relation to the pivot of said members, and means on the other hinge member cooperable with said device to partially rotate said device step by step into four positions when the closure is swung in one direction to a predetermined open position, then in a reverse direction to a locked position, and then successively in said first and second named directions again.

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